

Behind the Scenes of Automation: Ghostly Care-Work, Maintenance, and Interferences

Exploring participatory practices and methods to uncover the ghostly presence of humans and human labor in automation

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ABSTRACT

Industry and media have long represented automation as a harbinger of development and convenience in different areas of life. An anxious prospect to some, automation systems promise “progress” and profitability to others by conjuring corporate computational futures. What remains behind the scenes of these predictions and imaginaries of automation is the invisible human labor of global ghost workers caring for, maintaining, and repairing technologies. Invisible but irreplaceable, computation performed by humans in precarious conditions fills gaps that computer technologies lack skills and sensibility for. In this hybrid workshop, we ask who the “ghosts” are in the machines. The workshop will address the ghostly presence of humans and human labor in automation and its challenges to HCI research and design.

CCS CONCEPTS

• **Social and professional topics**; • **Human-centered computing**; • **HCI design and evaluation methods**;

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KEYWORDS

Automation, Ghost work, Labor, Design Fiction

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1 BACKGROUND

Industry, business consultancies, and media have long represented automation with its kindred artificial intelligence (AI) and robots as harbingers of development and “progress” to different areas of life—from leisure to work, education to public administration, agriculture to health. The convergence between cloud computing, big data, machine learning, algorithms, IoT, and robotics promises to deliver computational operations to support these areas in their everyday functioning, connect the world, and increase productivity and economic profitability of industries and economies to the liking of governments [1][5]. Recent global forecasts consider automation-as-a-service/AI-as-a-service solutions a thriving market for startups and tech giants alike [22]. At the same time, economy theorists

and critics periodically recall an automation anxiety of robots replacing human workers, repeating that it is different each time [21]. Automation debates and imaginaries reflect technological developments but are frequently running ahead of them, discussing possible futures while concealing current issues of automation [2]. Despite such promises and imaginaries, the sociotechnical processes and practices behind the scenes of automation look different. Human labor and presence in automated systems continue beyond their design and development in an opaque and distributed ways, as previous critical ethnographic scholarship on AI, robotics, and digital platforms has revealed [10][11][12][15][17][19].

Users interacting with shiny, automatic, seemingly “magic” apps, websites, or technologies, functionally rely on AI/ML-algorithms, big data, and clouds [4]. However, unconsciously and hidden from sight, users also interact with concealed and shadowed collectives of humans performing the “ghost work” of careful data preparation, cleanup, testing, and moderation for further processing and creating a seamless experience [6][9][16][20]. For instance, on platforms like Facebook, such ghost workers review flagged content that displays violence, sexual child exploitation, beheadings, and suicide [14]. Voice-activated assistants like Apple’s Siri or Amazon’s Alexa employ a network of ghostly listeners who listen through users’ personal conversations to improve data for machine learning and are thereby exposed to a set of mental risks [19]. Outside of controlled environments such as warehouses and production facilities, the breakdown of delivery robot applications reveals a reliance on remote human operators based in low-income and postcolonial countries instead of actually using AI and computer vision [8]. Likewise, robots in other applied settings such as production, logistics, care homes, or agriculture equally require situated care and maintenance by humans [13] but also begin reconfiguring the human collectives around them [7]. These instances recall what critical scholars have labeled as “fauxtimation” [18] or “pre-automation” [20]. Ghostly computation performed by humans in precarious conditions and with consequences for the workers’ mental health fills gaps that computer technologies lack skills and sensibility for, are too expensive, and still unreliable [3][19]. Making the often-suppressed work in the shadows of automation visible, unveiling those who care, maintain, and intervene in operations and interactions, becomes a liability for tech companies, their identities, and the sociotechnical imaginary of automation and AI. In this workshop we ask: Who are the “ghosts” in the machines?

This one-day hybrid workshop will address the ghostly presence of humans and human labor in automation and its challenges to research and design. Using the figure of the ghost as something that haunts and frightens if revealed yet equally captivating, this workshop has three overarching objectives. First, by inviting contributions that uncover different cases of invisible human labor in automation, practices, and processes, we will collectively lay the foundation for a multidisciplinary map of ghost work, fauxtimation, pre-automation, etc., to understand their extent, interferences, and implications. Second, the workshop will engage in explorative, collaborative, and qualitative research methods, for example, speculative design, design fiction, or digital ethnographies that allow inquiring into this otherness and “othering” of ghostly automation; and offer critical approaches, e.g., feminist; queer; postcolonial and decolonial; and Black, Indigenous and People of Color (BIPOC)

theories and interventions, as a possible way to address the dehumanization of automation and AI. Third, we will seek to develop creative and practical formats for design interventions that communicate the myriad of ghost work performed by low-paid global digital labor and users alike, the situations of human-computer interaction, and the possible outcomes.

In line with the overarching goals, the workshop will ask the following questions:

- How might HCI and HRI research unveil and respond to hidden labor in automation and AI, and understand the global, transnational, and postcolonial relations behind it?
- How do different theories, concepts, and methods enable us to study and design human-automation systems?
- What values and ethical principles need to be considered when studying and revealing ghostly automation?
- How can biased assumptions of whose work and what kind of work should be automatized be further challenged?
- How can examining and challenging the othering effects of ghost work help HCI scholars, activists, and practitioners mitigate the proliferation of the “AI hype”?
- How do we think about a future where multiple hauntings of automation become visible and can co-exist?
- What actionable steps and commitments can HCI scholars adopt to expose the conditions of hidden labor in AI and intervene in ways that lead to more socially equitable outcomes?

2 ORGANIZERS

The organizers’ research backgrounds cover a broad spectrum of workshop-related fields, including human-computer interaction, human-robot interaction, science and technology studies (STS), critical data studies, participatory design, critical technical practice, feminist technoscience, machine learning, and urban studies. Their work attends to various theoretical, methodological, and critical approaches.

Dr. Yana Boeva (main contact) is a postdoctoral researcher at Institute of Social Sciences and the Cluster of Excellence “Integrative Computational Design and Construction for Architecture” at the University of Stuttgart. Her recent work explores the introduction of advanced computational technologies, automation, and AI in architecture, construction, and the built environment. She has studied the sociotechnical and historical dimensions of digital fabrication, DIY maker cultures, and design.

Dr. Arne Berger is a Professor of Human-Computer Interaction at Hochschule Anhalt. He is fascinated by the complex, idiosyncratic and unintended interactions between humans and digital technology. His work is influenced by the Scandinavian tradition of Participatory Design, which recognizes that those who will be affected by a future technology should have an active say in its creation. Arne’s research focuses on early phases of design and development processes and he is particularly interested in how errors, failures, blips, and oversights shape how we think about future technology.

Dr. Andreas Bischof is Junior Professor for sociology with a focus on technology at Chemnitz University of Technology. His work centers around the genesis, adaptation and consequences of

digital technologies in multiple contexts, such as elderly care and employment. His research involves qualitative methods, such as ethnography, as well as designerly methods like cultural probes and workshops.

Olivia Doggett is a doctoral student in the Faculty of Information and the Faculty of Environment at the University of Toronto. Drawing from the disciplines of critical computing, design theory, information and environmental studies, her research explores the role of information services and technologies on agricultural production and farm labor.

Dr. Hendrik Heuer is a senior researcher at the Institute for Information Management Bremen (ifib) and the Centre for Media, Communication and Information Research (ZeMKI) at the University of Bremen. His research focuses on Human-Computer Interaction and Machine Learning. Currently, he is working on ways to fight misinformation.

Dr. Juliane Jarke is professor of digital societies at the University of Graz. Her research focuses on the increasing importance of digital data and technologies in the public sector, for education and ageing populations. Juliane follows a design-oriented and participatory approach that adapts and expands upon empirical social research, digital and ethnographic methods, combining them with approaches from HCI and participatory design research.

Dr. Pat Treusch is a MSCA Co-Fund Fellow in the Human+ Programme at the Trinity Long Room Hub and Associated Researcher at the ADAPT Centre, both Trinity College Dublin. Pat is a feminist science and technology studies scholar who is interested in researching human-machine relations with an emphasis on the role of affects and embodiment for human-robot-interaction.

Dr. Roger A. Søråa is Associate Professor at the Department of Interdisciplinary Studies of Culture at NTNU Norwegian University of Science and Technology. His main research interests are the digitalization and robotization of society and the ethical, gendered and epistemological consequences of this. He leads a research group on the digitalization and robotization of society and has a particular interest in healthcare technology and automation of work.

Dr. Jasmina Tacheva is Assistant Professor in the School of Information Studies at Syracuse University where she teaches courses on the social effects of data and artificial intelligence. Tacheva's main interest is at the intersection of social justice informatics and transnational queer and feminist theory, and her work in this area has appeared in journals such as *Big Data & Society*.

Maja-Lee Voigt is an urban designer, research associate as well as PhD student at Leuphana University Lüneburg, and co-founder of the interdisciplinary city research collective *Akteurinnen für urbanen Ungehorsam* in Hamburg. Assisted by a methodological toolbox of ethnographic and critical feminist thinking, her work focuses on the automation of logistical cities, tackling questions about (resisting) algorithmic architectures of oppression, and hacking patriarchy towards more just urban futures.

3 WEBSITE

Details about the workshop, the call for participation, organizers, and participants will be made available on our website: <https://yanaboeva.xyz/behindthescenesofautomation/>. We will ensure

that our website is fully keyboard navigable, screen reader accessible, color-contrast compliant with WCAG accessibility standards. The website will include a Google form for the submission of position papers. Additionally, the website will serve as a repository of accepted papers and workshop outputs before and after CHI'2023.

4 PRE-WORKSHOP PLANS

Information on the workshop and participation requirements will be announced through mailing lists and platforms in the HCI, CSCW, STS, platform and internet studies, labor studies communities (e.g. CHI announcements, PD announcements, STSGRAD, AoIR, Labor Tech Research Network, Maintainers, etc.), as well as various regional research groups to ensure diversity and international representation. Additionally, we will promote the call on social media platforms, with a collaborative reach of about 14,000 followers on Twitter alone, and through our individual networks.

The call for participation will be posted on the website, including a Google Form for the submission of position papers. Participants will be asked to submit a 3-4-page position paper (2,000 words maximum) in the ACM Master Article Submission Template, responding to the themes and questions of the workshop call. The conference organizers will select position papers through peer review and virtual refereeing. Each submission will be assigned to at least two organizing team members for review. Priority will be given to papers that address the central questions of the workshop, present concrete research ideas and novel perspectives, or demonstrate compelling case studies of ghostly automation. We plan to accept 10-15 position papers.

Before the workshop, papers will be shared among participants to provide ample time for discussion and interaction during the one-day workshop.

5 WORKSHOP STRUCTURE

5.1 Workshop Setup

Our workshop will be a *one-day hybrid event* broken into five blocks to cover multiple time zones (see Table 1 for preliminary schedule). The hybrid format allows to accommodate participants with travel limitations due to the Covid-19 pandemic or visa restrictions, as well as individuals who share health and accessibility-related concerns and needs. Offering a hybrid mode, we would also like to open up our workshop to those with care responsibilities, acknowledging that conference travels often exclude academics with families and caretakers.

Participants unable to attend in-person will participate via Zoom or Webex meeting platform (tbc.). We will provide a dedicated laptop, speakers, and monitor to interact with our virtual participants. Additionally, we will activate the live caption function on Zoom/Webex throughout the workshop and share copies of participants' presentations and materials digitally so that both synchronous and asynchronous participants can follow along.

We will designate two workshop organizers per session as virtual hosts to facilitate the virtual portion of the hybrid workshop. This role will help facilitate conversations between local and virtual attendants as well as oversee any technical and logistic issues. The virtual meeting will be recorded and the recording will be shared with all participants.

Table 1: Workshop Schedule*

Time	Activity
8:30 – 9:00 am	Arrival and technical setup
9:00 – 9:15 am	Welcome, introduction, and workshop overview
<i>Morning session</i>	
9:15 – 10:30 am	Presentation block 1: Short paper presentations, in parallel multidisciplinary map design activities
10:30 – 10:45 am	<i>Coffee break</i>
10:45 am – 12:00 pm	Presentation block 2: Short paper presentations, in parallel multidisciplinary map design activities
12:00 – 1:00 pm	<i>Lunch break</i>
<i>Afternoon session</i>	
1:00 – 1:15 pm	Brief recap morning session to accommodate participants from different time zones
1:15 – 2:30 pm	Presentation block 3: Short paper presentations, in parallel multidisciplinary map design activities
2:30 – 2:45 pm	<i>Coffee break</i>
2:45 – 3:30 pm	Group exploration and ideation (speculative design / design fiction) for exploring ghost workers' role and giving voice to them
3:30 – 4:15 pm	Group mapping activity (formats, first designs) & discussion
4:15 – 4:30 pm	Future work and closing remarks

This is a preliminary schedule. To be adapted according to the number of submissions and on-site/virtual participation.

5.2 Activities and Timing

The workshop will be divided into a morning and an afternoon session with a lunch break in-between. The workshop will begin with a brief introduction of the workshop agenda, format, and the organizers. The morning session will be divided into two blocks of position paper presentations. Paper presentations will be 15 minutes in length (10 minutes presentation, 5 minutes for Q&A) and grouped into blocks of 4-5 papers based on theme, case study, and research methods. In parallel to the presentations, workshop organizers and participants will begin to map the different examples of ghost work in automation technologies.

The afternoon session will begin with a short summary of presentations, discussions, and key takeaways from the morning session. The recap provides an introduction to participants unable to attend the morning session due to time zone issues. The session will be divided into a block with position paper presentations and a block with participatory activities. Together with the invited participants using speculative design and design fiction methods, we will first explore ghost workers by taking on their role and then ideate means for giving voice to them. This activity will be followed with a joint group mapping to find formats and first designs for a digital participatory atlas of ghost work in automation.

To support and extend the academic exchange during our workshop sessions we are using a Miro or Conceptboard (tbc.). Collaboratively mapping and graphically recording shared insights, examples, and further ideas will continue our conversations beyond our getting together. Additionally, it allows in-presence and virtual participants to meet online, thus functioning as a collective space, forum of exchange, and documentation.

Additionally, we plan to produce a podcast series based on the paper submissions and topics. A podcast series allows the broader dissemination of workshop discussions and research to audiences beyond the academic community. Participants will be asked to prepare their paper presentations according to a podcast concept.

The workshop organizing team will prepare a concept for moderation and podcast questions based on the position papers and discuss these in advance with participants as well as obtain their permission to record. We will live-record the presentations during the workshop. All recording technology and technical support will be provided by one of the workshop organizers who brings extensive experience in podcast production within (e.g., <https://www.buzzsprout.com/1323889>) and outside academia. After post-production and upon permission granted by the workshop participants, the podcast episodes will be hosted on the workshop website.

6 POST-WORKSHOP PLANS

The workshop results and discussions will be archived on the website upon participants' agreement. The principal output is to create a digital participatory and open access atlas based on the virtual group work (Miro/Conceptboard) to present all examples, materials (i.e., theories and approaches), and ideas on uncovering ghostly automation. It aims to encourage participants' collaboration and exchange beyond the workshop as well as invite new contributions. We will ideate accessible and easy-to-convert formats for the use of the atlas in teaching and dissemination to a broader audience. Additionally, we will invite participants to jointly work on one short piece for ACM Interactions magazine, sharing the outcomes of the workshop. With the brief Interactions piece and the atlas, we aim to counter the broader (promotional) narratives of automation/AI-as-a-service and identify the ghostly labor behind it, the frictions of encountering the invisible humans-in-the-loop, and the risks and impact of ghost work on human-computer interaction.

7 CALL FOR PARTICIPATION

Industry and media have long represented automation as a harbinger of development and convenience in different areas of life. What remains behind the scenes of these predictions and imaginaries of automation is the invisible human labor of global ghost

workers caring for, maintaining, and repairing technologies. Invisible but irreplaceable, computation performed by humans in precarious conditions fills gaps that computer technologies lack skills and sensibility for. In this one-day hybrid workshop, we ask who the “ghosts” are in the machines. The workshop will address the ghostly presence of humans and human labor in automation and its challenges to HCI research and design. Additionally, it aims to explore methods to collectively create a multidisciplinary map, offering a stage to ghostly care work, maintenance, and interferences.

We welcome position papers (3-4 pages) responding to the themes and questions of the workshop call. We invite scholars and practitioners from various career stages and from different backgrounds. We will prioritize papers that address the central questions of the workshop, demonstrate compelling case studies of ghostly automation, engage with creative research approaches, or develop practical formats for design interventions. At least one author must be able to attend the workshop (virtually or on-site), and all participants must register for at least one day of the conference.

Information about the workshop and all workshop activities will be made available through our website: <https://yanaboeva.xyz/behindthescenesofautomation/>. Accepted papers will be shared among participants prior to the workshop.

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